

# Managing Spatial Data For Wetlands In The San Francisco Bay Area

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## Abstract

The San Francisco Bay Area Bay Area Network (SFAN) hosts and protects a wide array of wetland areas, from the coastal plains of Point Reyes to the arid slopes of Pinnacles National Park. Several different mapping techniques had been used to inventory the network's wetland areas, and the spatial data had not been organized. The project I present here explains how spatial wetland data for SFAN was organized. Over the course of the project I worked with wetland specialists in three parks to locate, catalog, and compile wetland data into a single geodatabase in ArcGIS.

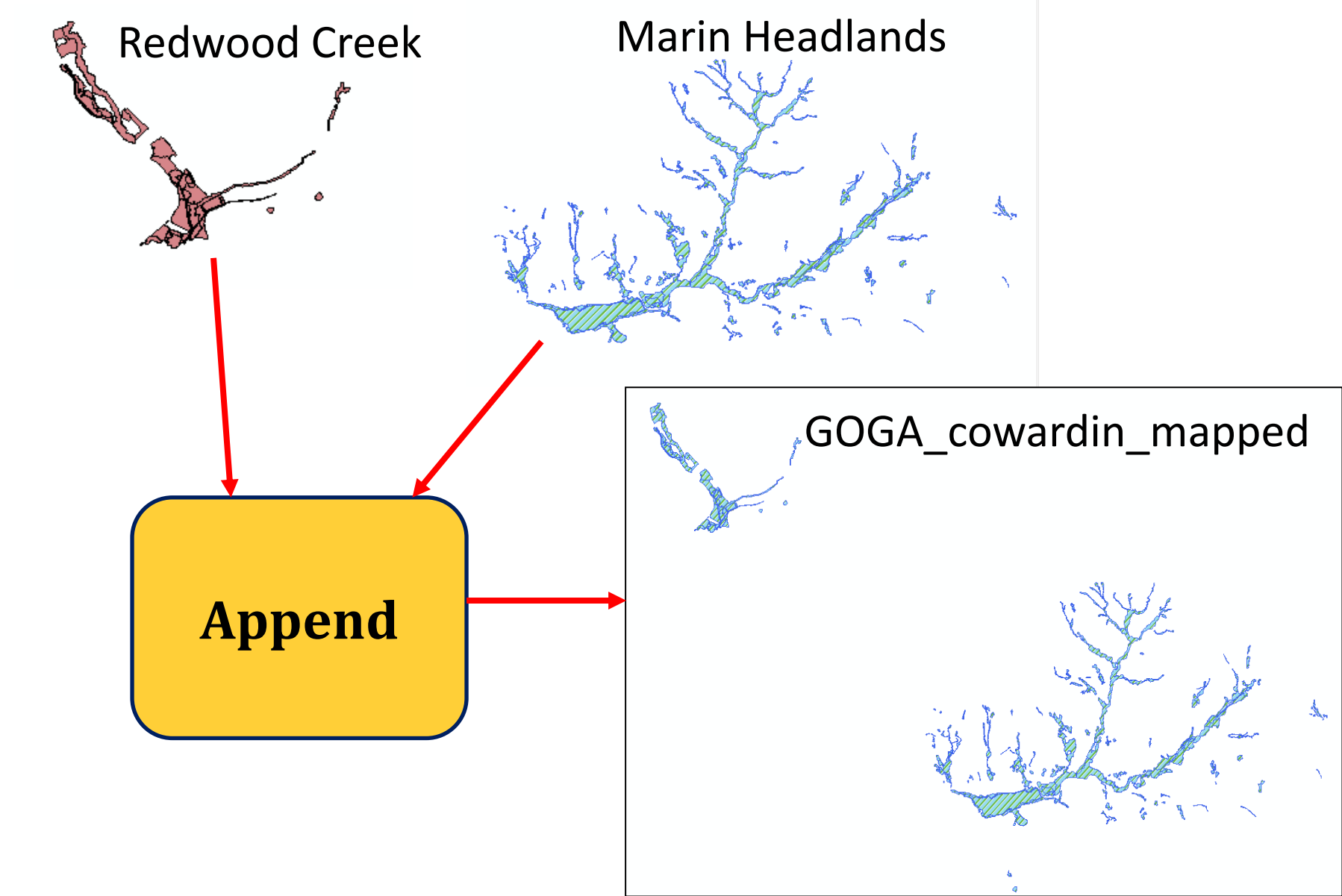
## Introduction

Wetlands in the Bay Area are found in a diverse range of microclimates with varying levels of urban development. To classify wetlands the National Park Service uses three different mapping standards:

1. US Army Corps of Engineers (USACE) Jurisdictional Mapping – used to determine the presence of any wetlands affected by construction on federal land.
2. Classification of Wetlands and Deepwater Habitats of the US (USFWS) – used by most federal agencies as a system of classifying wetlands on a national level
3. NWI Wetlands – remote sensing conducted by the US Fish and Wildlife Service National Wetland Inventory to determine wetlands based off of aerial photography.

## Methodology

The first step for this project was to gather all of the necessary data. During the first half of the project, wetland specialists at three SFAN parks were asked to identify spatial data to be included in the final database. The parks – Golden Gate NRA, Point Reyes NS and Pinnacles NP – were the three facilities in the network with substantial amounts of wetland.

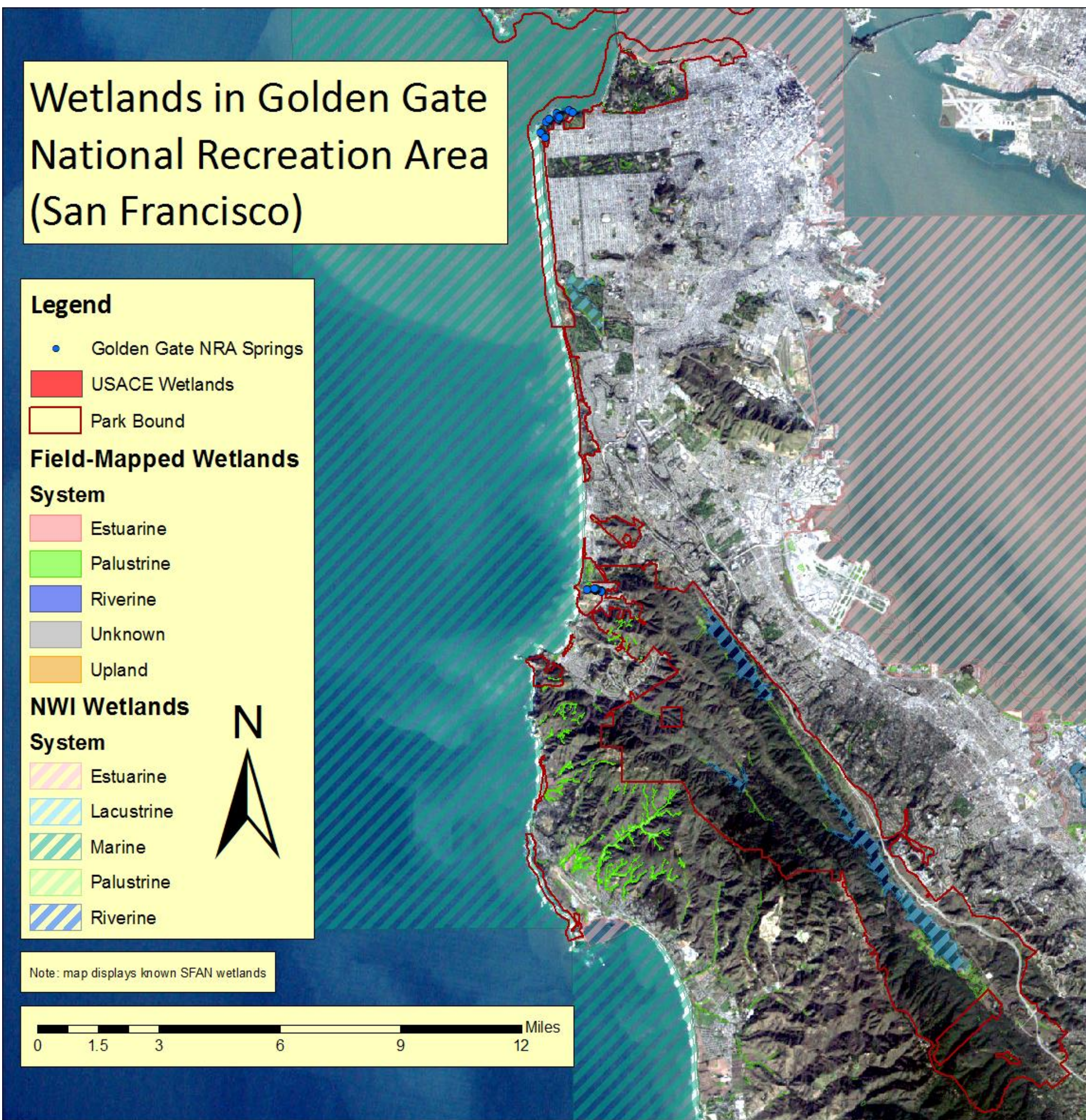
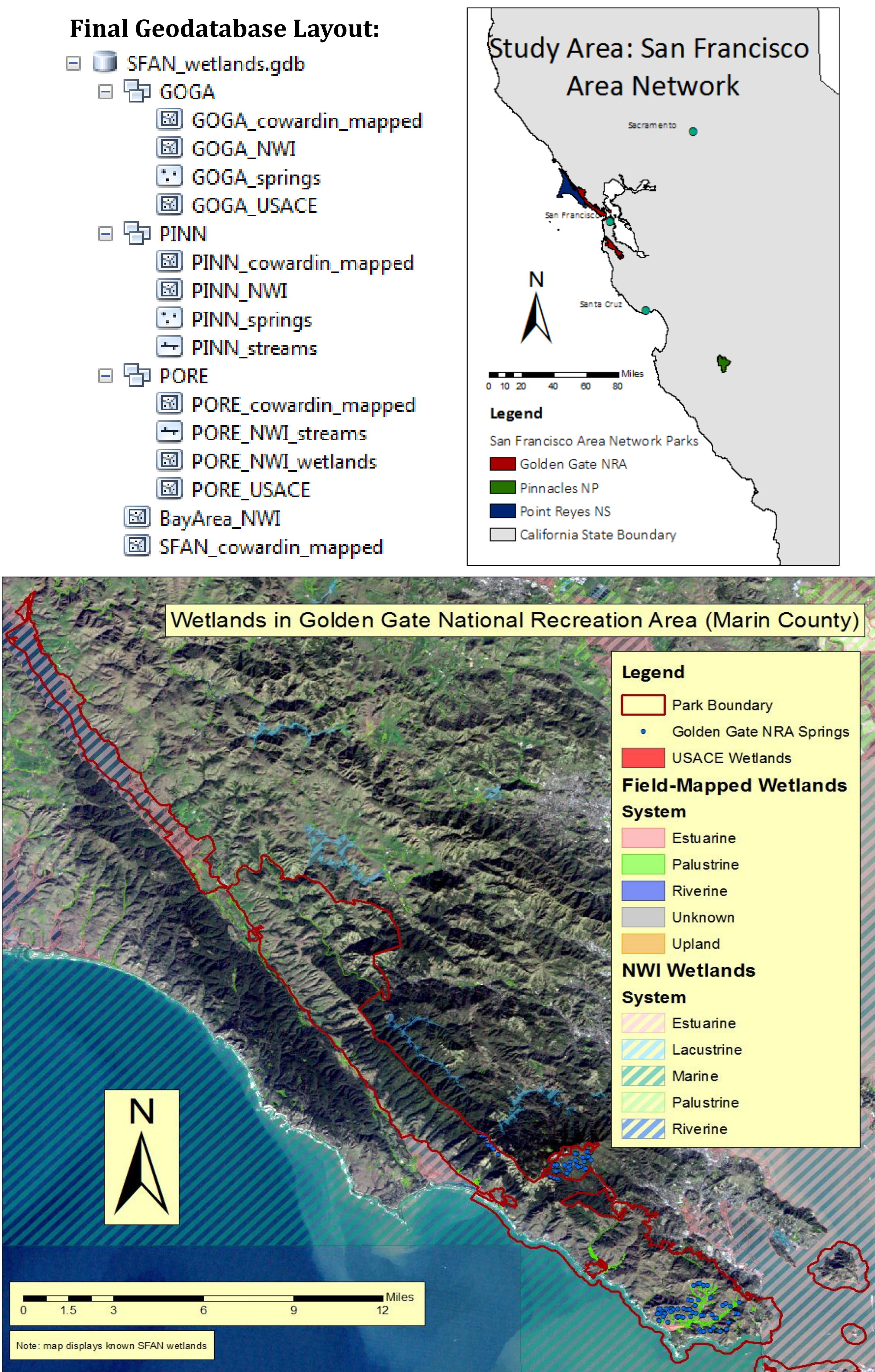
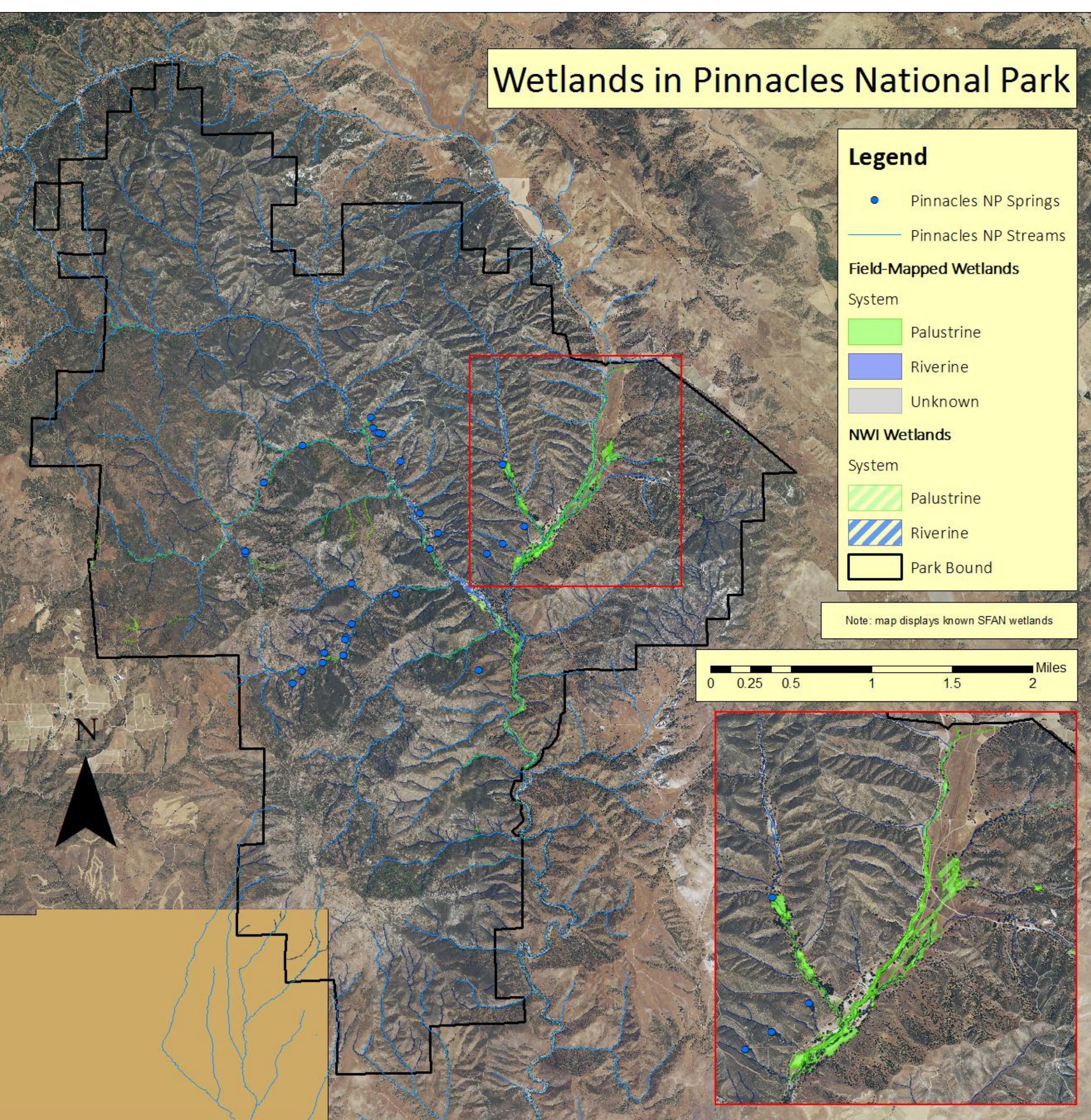
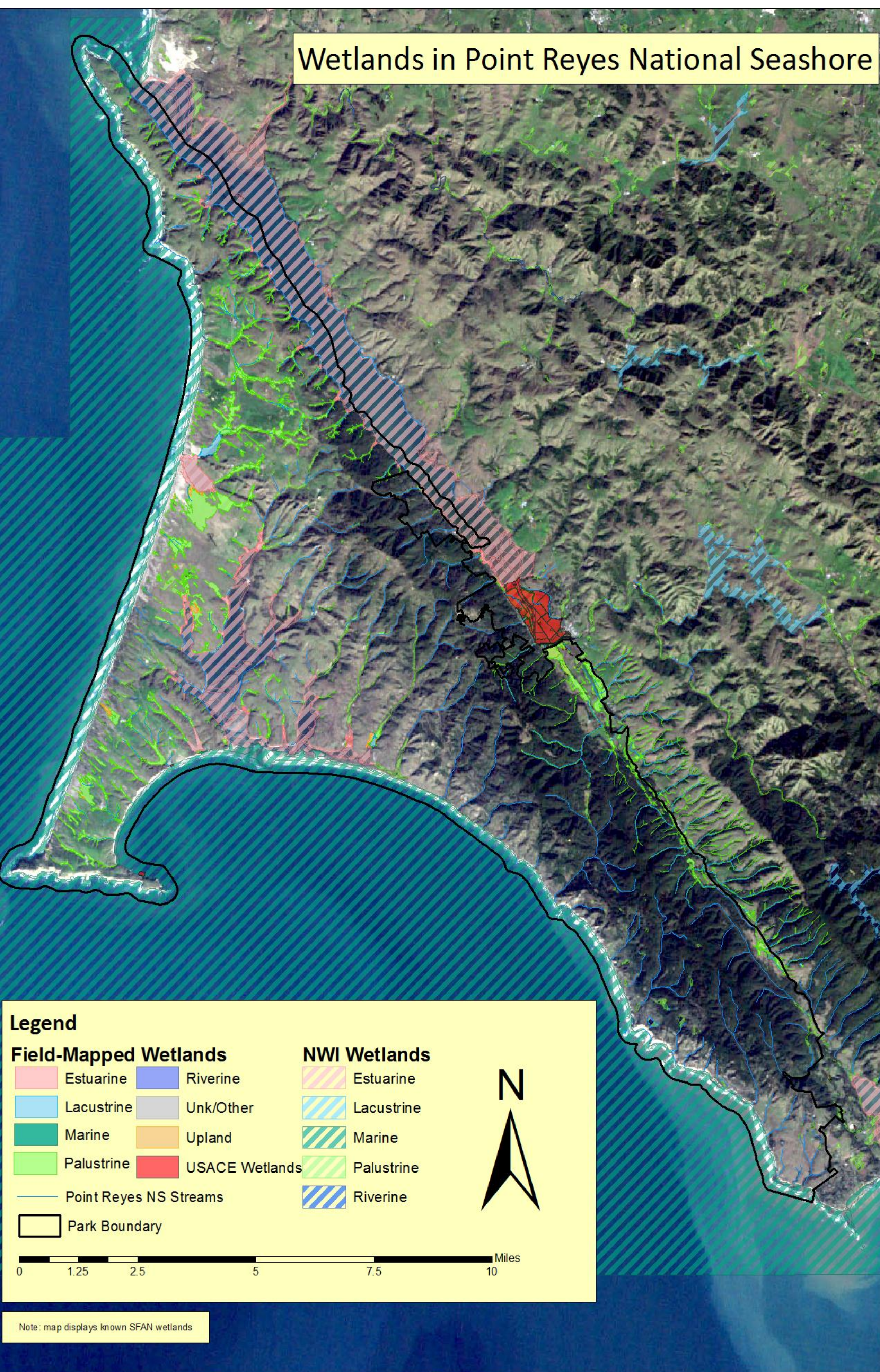


After I gathered the correct data, I created the hierarchy for the final geodatabase. Within the database there are three feature datasets: one for each park. Multiple feature datasets represent each SFAN park. Each feature class represents the wetland data surveyed for a specific mapping standard.

Data was added to the wetlands geodatabase in Esri's ArcMap and ArcCatalog. All previously existing wetland shapefiles were given uniform attribute fields. The *Append* tool was used to add the gathered data. The *Load Data* tool in ArcCatalog was used in instances where field names of the original shapefiles did not match those in the geodatabase.

The final product is a set of feature classes that combine all of the original data from the different parks into one file geodatabase.

## Results



## Discussion

There are several potential uses of the geodatabase:

- **Park Planning and Resource Management.** This effort contributes to fulfilling the mandate, in the NPS Director's Order #77-1: Wetland Protection, to inventory wetlands for use in assuring proper planning with respect to management and protection of wetland resources. If a SFAN park's natural resource management division or Inventory and Monitoring department want to determine where there are wetlands, and how much is known about them, then it is useful to have one wetlands database to access. Additionally, if a park wanted to conduct new wetland surveys, then this geodatabase would be a good place to start.
- **Construction of Park Infrastructure and Facilities.** Before a construction project can break ground on federal land it must be surveyed to determine if development would impact any wetland habitats. In the event of a proposed construction project, such as a road, park officials can use spatial data to predetermine if the road would intersect with existing wetlands. Additionally it could be predetermined where NPS and USACE wetland delineations have already occurred and how current those surveys are.
- **Research and Data Management.** The geodatabase can be exported and used by all park staff. Aquatic researchers from both inside and outside the parks can use this geodatabase as a reference when selecting research study sites. It is helpful for the parks and network to have one cohesive version of wetland data. Having one version reduces the potential for confusion when more wetland data is gathered in the future and appended to this data base.

## Future Applications

Because GIS data is often times unwieldy, it is difficult to manage the large number of files that are created in a single project. This is especially true when only a small number of the files will actually be used in the future.

For this reason it is important when managing data for projects within the Park Service to keep separate *working* and *master* folders. Separate working and master folders were created. The working folder is for any files created during an analysis and the master folder is for any final products. Final products should also contain complete metadata and any reports or documentation written for the project. This would by far increase the ease at which future users can access and understand the GIS data.

The method of GIS data management outlined in this project could serve as a model for managing other natural resource geodata, and adopted by other parks and divisions for managing geodatabases.

## Acknowledgments



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